

Questions for SWRCB Science Symposium and Expert Panel to Support WQCP Update Phase ii

1. Invasive Species

- a. what is the role of different flow attributes (magnitude, timing, duration, inter-annual frequency) and variation in these in facilitating or inhibiting invasion of the SFE by non-native species?
- b. what is the role of different flow attributes (magnitude, timing, duration, inter-annual frequency) in reversing or repressing non-native species' invasions after they have begun?
- c. How do the certainty and expected magnitude of these effects compare to other, non-flow related actions? Are their potential synergies or conflicts between flow and non-flow actions to control invasive species?

2. Food web stimulation

- a. what is the role of different flow attributes (magnitude, timing, duration, inter-annual frequency) and variation in these in stimulating primary productivity and the zooplankton prey base for native vertebrates in the SFE? Please detail the different mechanisms by which changes in relevant flow attributes can impact different *mechanisms* of food production?
- b. Which flow-related mechanisms of food production may be modified through the successful restoration of shallow water habitats? Which of these flow-related mechanisms will not be affected by habitat restoration?
- c. what is the role of different flow attributes (magnitude, timing, duration, inter-annual frequency) and variation in these in distributing prey items produced in restored shallow Delta environments to other habitats in the Delta and beyond?
- d. what is the potential effect of shallow water habitat restoration efforts on the magnitude of primary and secondary production in the SFE? Do the potential effects change as distance from the restored habitat increases? If so, describe how the effect of restored shallow water habitats on food web productivity would be expected to affect different target organisms.
- e. Please rank different means of modifying food web productivity (e.g. primary and secondary production) on the following axes: magnitude of anticipated benefits to different species, certainty that benefits will materialize (for each species) from implementing the action, time to realize benefits from approval of action, reversibility of action (i.e. if undesirable impacts arise or desired impacts do not materialize)

3. Transportation/Retention/Migration

- a. what is the role of different flow attributes (magnitude, timing, duration, inter-annual frequency) and variation in these in providing for adequate migration/retention of different life stages of Delta organisms and for transportation/retention of essential nutrients or harmful toxins through the Estuary?
- b. What non-flow related mechanisms would facilitate transportation/retention/migration of organisms, nutrients, toxins through the Delta ecosystem?

- c. Are their potential synergies or conflicts between flow and non-flow actions to improve transportation/retention/migration of organisms, nutrients, toxins in the ecosystem?
 - d. Please rank different means of improving transportation/retention/migration dynamics on the following axes: magnitude of anticipated benefits to different species, certainty that benefits will materialize (for each species) from implementing the action, time to realize benefits from approval of action, reversibility of action (i.e. if undesirable impacts arise or desired impacts do not materialize)
4. What is the role of freshwater flow attributes (magnitude, timing, duration, inter-annual frequency) in providing adequate spatial distribution of key living resources?

Recommendations for Expert Panel Service

Wim Kimmerer

Bruce Herbold

Judy Meyers (UGA, emeritus -- big player in the ERP process; ecosystem processes and trophic transfer, esp in aquatic ecosystems)

Anna C. Tyler (Rochester/Cornell -- former Ted Grosholz post-doc and expert on SFE tidal marshes; nutrient and energy flows in tidal ecosystems)

Gary Grossman (UGA -- has served on ERP panels and BDCP panels, fish biology/ecology; former doctoral student of PB Moyle (~20 years ago)

Alan Jassby (UCDavis emeritus -- known and loved by all)

James Hobbs (UCDavis, Fish biology, especially smelt, wetland restoration)